WHAT IS CLAIMED IS:

1. A feed forward amplifier system, comprising:

an input for receiving an RF input signal;

a first control loop coupled to the input and comprising a main amplifier, a main amplifier sampling coupler, a delay element, and a cancellation combiner;

a second control loop coupled to the first control loop and comprising a first signal path, a second signal path comprising an error amplifier, and an error coupler coupling the first and second signal paths;

an output coupled to the error coupler; and

means for controlling at least one of the first and second control loops employing an alignment list having a plurality of list elements, each element having an alignment setting and a collection of parameters characterizing the operating condition of the feed forward amplifier system.

2. A feed forward amplifier system as set out in claim 1, wherein said first control loop further comprises a gain adjuster and a phase adjuster and wherein each said alignment setting comprises a loop 1 gain adjuster setting and a loop 1 phase adjuster setting.

3. A feed forward amplifier system as set out in claim 1, wherein said second control loop further comprises a gain adjuster and a phase adjuster and wherein each said alignment setting comprises a loop 2 gain adjuster setting and a loop 2 phase adjuster setting.

4. A feed forward amplifier system as set out in claim 1, wherein said collection of parameters characterizing the operating condition of the feed forward amplifier system comprises one or more of temperature, DC power supply, input signal power and input signal carrier frequency.

5. A feed forward amplifier system as set out in claim 4, wherein said collection of parameters characterizing the operating condition of the feed forward amplifier

system are defined as an attribute vector and a distance is defined between any two attribute vectors.

6. A feed forward amplifier system as set out in claim 5, wherein said means for controlling obtains a current attribute vector and computes the distance to the attribute vectors of the list elements and selects the list element with the least distance for use as an alignment setting in the control function.

7. A feed forward amplifier system as set out in claim 6, wherein said means for controlling continually measures misalignment of the feed forward amplifier system and retrieves an alignment setting from said alignment list when said measured misalignment exceeds a predetermined value.

8. A feed forward amplifier system as set out in claim 7, wherein said means for controlling employs a selected element as an initial alignment setting and computes a new alignment setting from the initial setting employing an iterative control algorithm.

9. A feed forward amplifier system as set out in claim 8, wherein said means for controlling updates said alignment list with a new alignment setting after completing said iterative computation.

10. A feed forward amplifier system as set out in claim 5, wherein the distance between closest list element attribute vectors varies throughout the list.

11. An adaptive controller for controlling a loop of an amplifier system, comprising:

one or more inputs for receiving one or more attribute parameters corresponding to current operating conditions of the amplifier system; and

one or more processors coupled to said one or more inputs and having an associated alignment list and programmed with an alignment list algorithm and a controller algorithm to provide loop adjustment settings to control the loop of the

amplifier system, wherein said alignment list algorithm generates said list with adjustment settings computed by said controller algorithm and associates one or more attribute parameters with each adjustment setting.

12. An adaptive controller for controlling a loop of an amplifier system as set out in claim 11, wherein said alignment list algorithm selects an alignment setting from said alignment list for use by said controller algorithm at start up or when the loop becomes sufficiently misaligned.

13. An adaptive controller for controlling a loop of an amplifier system as set out in claim 12, wherein said alignment list algorithm selects an alignment list adjustment setting for use by said controller algorithm by computing the distance between the one or more attribute parameters corresponding to current operating conditions and the attribute parameters associated with each of the alignment settings in the list and selecting the alignment setting corresponding to the attribute parameter with the minimum distance.

14. An adaptive controller for controlling a loop of an amplifier system as set out in claim 12, wherein the distance computation is weighted with different weights for different attribute parameters.

15. An adaptive controller for controlling a loop of an amplifier system as set out in claim 11, wherein the attribute parameters comprise one or more of temperature, DC supply voltage, input signal power and input signal carrier frequency.

16. An adaptive controller for controlling a loop of an amplifier system as set out in claim 14, wherein the distance d_{attr} between two sets of attribute parameters "n" and "0", is defined by the weighted L_{inf} norm distance measure or the weighted L_2 norm distance measure.

17. An adaptive controller for controlling a loop of an amplifier system as set out in claim 11, further comprising one or more inputs for receiving alignment data.

18. An adaptive controller for controlling a loop of an amplifier system as set out in claim 17, wherein said one or more inputs for receiving alignment data comprises a pilot signal input.

19. An adaptive controller for controlling a loop of an amplifier system as set out in claim 17, wherein said one or more inputs for receiving alignment data comprises an input for loop test data.

20. An adaptive controller for controlling a loop of an amplifier system as set out in claim 11, wherein said adjustment settings comprise gain adjuster and phase adjuster settings.

21. A method for controlling an amplifier system having a control loop comprising a control loop input, a first signal path, a second signal path, and a control loop output, at least one of said first and second signal paths including an amplifier, said method comprising:

providing a list of alignment settings, each alignment setting having an associated operating condition;

detecting the current operating conditions of the amplifier system;

comparing the current operating conditions to those in the list of alignment settings; and

selecting the alignment setting associated with the most similar operating condition in the list.

22. A method for controlling an amplifier system as set out in claim 21, wherein the relevant operating conditions are configured as a multi-dimensional attribute vector.

23. A method for controlling an amplifier system as set out in claim 22, wherein said comparing comprises measuring a distance between the current attribute vector and each of the attribute vectors of the list.

24. A method for controlling an amplifier system as set out in claim 23, wherein said selecting comprises determining the attribute vector having minimum distance from the current operating condition attribute vector.

25. A method for controlling an amplifier system as set out in claim 21, further comprising computing a new alignment setting employing an iterative loop controller algorithm, wherein the alignment setting associated with the most similar operating condition is used as the initial alignment setting for the adaptive loop controller algorithm.

26. A method for controlling an amplifier system as set out in claim 25, further comprising updating the alignment list with a new alignment setting computed by the adaptive loop controller algorithm.

27. A method for controlling an amplifier system as set out in claim 21, wherein the size of the alignment list is dynamic.

28. A method for controlling an amplifier system as set out in claim 23, wherein the spacing of the stored adjustment settings, as defined by the attribute vector distance, varies through the list.

29. A method for controlling an amplifier system as set out in claim 28, wherein a higher density of adjustment settings is provided in regions of the list where the alignment is most sensitive to one or more operating conditions comprising the attribute vector.

30. A method of maintaining a list of alignment settings of a control loop of an amplifier system, said list comprising a plurality of elements each element having an alignment setting and a set of parameters corresponding to operating conditions of the amplifier system, said method comprising:

selecting an element of the alignment list;

determining the element of the alignment list having the most similar corresponding operating conditions to the selected element;

determining if the two elements are sufficiently similar to be considered redundant; and

deleting the oldest of the two elements of the alignment list if the elements are redundant.

31. A method of maintaining a list of alignment settings of a control loop of an amplifier system as set out in claim 30, wherein said selecting an element of the alignment list comprises selecting the oldest element of the list not previously subject to list maintenance processing.

32. A method of maintaining a list of alignment settings of a control loop of an amplifier system as set out in claim 30, wherein said determining the element of the alignment list having the most similar corresponding operating conditions to the selected element comprises determining a distance measure to the operating condition parameter values of each of the remaining elements of the alignment list and selecting the element having the minimum distance.

33. A method of maintaining a list of alignment settings of a control loop of an amplifier system as set out in claim 32, wherein said distance measure comprises a weighted difference between parameter values corresponding to operating conditions.

34. A method of maintaining a list of alignment settings of a control loop of an amplifier system as set out in claim 33, wherein said parameters corresponding

to operating conditions of the amplifier system comprise one or more of temperature, DC power supply, input signal power and input signal carrier frequency.

35. A method of maintaining a list of alignment settings of a control loop of an amplifier system as set out in claim 30, wherein said determining if the elements are sufficiently similar to be considered redundant comprises determining a distance measure between the alignment settings and comparing the alignment distance to a redundant distance threshold.

36. A method of maintaining a list of alignment settings of a control loop of an amplifier system as set out in claim 32, wherein said determining if the elements are sufficiently similar to be considered redundant comprises comparing the distance between the operating condition parameters of the two elements to an outdated distance threshold.

37. A method of maintaining a list of alignment settings of a control loop of an amplifier system as set out in claim 30, further comprising repeating said list maintenance processing for each element of the alignment list.

38. A method of generating a hierarchical list of alignment settings of a control loop of an amplifier system, said list comprising a plurality of elements each element having an alignment setting and a corresponding set of parameters corresponding to operating conditions of the amplifier system, said list having a hierarchical structure comprising at least two levels, said method comprising:

selecting an element in a first level of the alignment list;

determining the element of the first level of the alignment list having the most similar corresponding operating conditions to the selected element; and

demoting the oldest of the two elements to a lower level of the hierarchical alignment list.

39. A method of generating a hierarchical list of alignment settings of a control loop of an amplifier system as set out in claim 38, wherein said determining the element of the alignment list having the most similar corresponding operating conditions to the selected element comprises determining a distance measure to the operating conditions of each of the remaining elements of the first level of the alignment list and selecting the element having the minimum distance.

40. A method of generating a hierarchical list of alignment settings of a control loop of an amplifier system as set out in claim 38, further comprising determining if the two elements are redundant, wherein said older element is only demoted if the elements are redundant.

41. A method of generating a hierarchical list of alignment settings of a control loop of an amplifier system as set out in claim 38, further comprising repeating said list processing for each level of the hierarchical list.

42. A method of generating a hierarchical list of alignment settings of a control loop of an amplifier system as set out in claim 41, wherein said older entry is deleted if the list maintenance processing is at the lowest level of the hierarchy.

43. A method of generating a hierarchical list of alignment settings of a control loop of an amplifier system as set out in claim 38, wherein said demoted element is associated as a subset list entry of the redundant element not demoted.

44. A method of generating a hierarchical list of alignment settings of a control loop of an amplifier system as set out in claim 43, wherein an element being demoted and having a subset list is merged with the subset list of a redundant element not demoted.

45. A method for controlling an amplifier system having a control loop comprising a control loop input, a first signal path, a second signal path, and a control loop

output, at least one of said first and second signal paths including an amplifier, said method comprising:

providing a hierarchical list of alignment settings having at least two levels, each alignment setting having an associated operating condition and some or all of the alignment settings in a highest level having subset alignment settings in a lower level;

detecting the current operating conditions of the amplifier system;

comparing the current operating conditions to those in the highest level of the hierarchical list of alignment settings;

selecting the alignment setting associated with the most similar operating condition in the highest level of the list;

comparing the current operating conditions to those in the subset of the selected highest level alignment setting;

selecting the alignment setting of the subset with the most similar operating condition; and

selecting the alignment setting in the higher or lower level having the most similar operating condition to the current operating condition.

46. A method for controlling an amplifier system as set out in claim 45, further comprising repeating the processing for each level of the hierarchical list until the next lower subset is empty.

47. A method for controlling an amplifier system as set out in claim 45, wherein the highest level has a coarser spacing of alignment settings than the lower level.

48. A method for controlling an amplifier system as set out in claim 47, wherein any two alignment settings have an alignment distance and wherein the highest level has a larger alignment distance between settings than said lower level.

49. A method for controlling an amplifier system as set out in claim 47, wherein said alignment distance is a weighted difference between the adjustment settings.

50. A method for controlling an amplifier system as set out in claim 49, wherein the adjustment settings are a gain adjustment and phase adjustment setting and wherein the weighting is an alignment sensitivity.